ABSTRACT

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Glutathione peroxidases (GPxs) are considered to be key antioxidant enzymes. A total of 8 human genes encoding GPxs are known. The main task of these enzymes is protecting biomolecules from oxidative damage due to oxidative stress, which arises from the imbalance between the generation and removal of free radicals. These enzymes catalyze the reduction of free hydrogen peroxide and organic hydroperoxides to water or corresponding alcohols.

This work is focused on influencing gene expression of monomeric enzyme GPx7 by microRNA. GPx7 is involved in the correct composition of proteins in the endoplasmic reticulum, in the proper course of adipogenesis, and suppresses development of cancer. Short single-stranded non-coding microRNA molecules are involved in post-transcriptional regulation of gene expression. These molecules negatively influence the translation process, ie the translation of mRNA into the protein. MicroRNAs bind to the binding region predominantly inside of the 3'UTR mRNA of the target gene.

The aim of this study was to experimentally verify whether bioinformatically predicted miR-29b and miR-335 molecules interact with the 3'UTR binding region of mRNA encoding GPx7. A luciferase assay was used for both tested microRNA. For testing miR-335, a plasmid with a mutated binding region was prepared by Pfu mutagenesis.
MiR-29b was found to inhibit GPx7 expression, but miR-335 not.